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Funding Growth in Bank-Based and Market-Based Financial Systems

Evidence from Firm-Level Data

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How the relative development of a country's stock market and banking system affects firms' growth is closely tied to how well developed the country's contracting environment is. How differences in the contracting environment affect the relative development of the stock market or banking system may have implications for which firms and which projects get financing.

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Summary findings

Demirgüç-Kunt and Maksimovic investigate whether firms' access to external financing to fund growth differs between market-based and bank-based financial systems.

Using firm-level data for 40 countries, they compute the proportion of firms in each country that relies on external finance and examine how that proportion differs across financial systems. They find that the development of a country's legal system predicts access to external finance and that stock markets and the banking system have different effects on access to external markets. The development of securities markets is related more to the availability of long-term financing, whereas the development of the banking sector is related more to the availability of short-term financing.

They find no evidence, however, that firms' access to external financing is predicted by an index of the development of stock markets relative to the development of the banking system.

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Funding Growth in Bank-Based and Market-Based Financial Systems: Evidence from Firm Level Data

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1. INTRODUCTION

A key question in development economics is the relation between a country's financial system and its economic development. Historians such as Gerschenkron (1962) have sought to explain a perceived relation between the differences in the pattern of economic development between Britain and the Continental European economies and the differences between bank-based and market-based financial systems. More recently, the differences in the relative performance of the Japanese and the US economies have led observers to conclude that bank-based and market-based financial systems may produce different growth patterns.[1] This view has been challenged by Laporta, Lopez-de-Silanes, Shleifer and Vishny (LLSV) (1998, 1999), who argue that the legal system in a country is a primary determinant of the effectiveness of its financial system. An implication of this hypothesis is that the distinction between market-based and bank-based financial systems may not be of primary importance for policy.

In this paper we use firm-level data from a panel of forty countries to analyze how a country's legal and financial systems affect firms' access to external finance to fund growth. For each country we predict a financial system based on the country's legal environment. We use our estimates to ask: Does the financial system have an effect independent of the legal system? Is the use of external financing different in market-based and bank-based systems? Do the market-based and bank-based systems differ in the provision of long-term and short-term funds?

We find that the use of external financing by firms is positively related to the development of both the predicted banking system and the securities markets in each

country. However, in our sample we do not find evidence that variations in the development of the financial system that are unrelated to the legal system affect access to external finance. In particular, we find no evidence that firms use external financing differently if they are in countries classified as bank-based or market-based, on the basis of the development of their banking sector relative to their securities markets.

These results are consistent with the LLSV approach that stresses the primacy of the legal system. The policy implication that flows from the results is that the way to improve access to external finance is to aid in the development of a country's legal system, and then to let firms and investors contract either directly (as in a market-based system) or through the intermediation of banks.

We also find that securities markets and bank development have a different effect on the type of external finance firms obtain, particularly at relatively low levels of financial development. In those countries where the legal contracting environment predicts a high level of development for securities markets, more firms grow at rates requiring long-term external finance. We do not find the same effect for predicted bank development. Thus, especially for countries with lower levels of financial development, differences in contracting environments that affect the relative development of the stock market and the banking system may have implications for which firms and which projects obtain financing.

There exists a growing literature on the effect of financial sector development on economic development. King and Levine (1993a,b) highlight the importance of financial development for macro-economic growth. Recently Levine and Zervos (1998), Rajan and

[1] For a critical examination of the effect of the legal and market environment on corporate finance see Stulz (1999). Allen (1993) and Allen and Gale (1999) provide analyses of the relative benefits of market-based

Zingales (1998) and Demirguc-Kunt and Maksimovic (1998) explore the relation between financial development and growth of countries, industries and firms, respectively.[2]

The importance of the legal system for corporate finance was first explored by LLSV (1998). Modigliani and Perotti (1999) argue that in the absence of a strong legal system that can protect the rights of external investors, financial transactions are intermediated through institutions or concentrated among agents who have sufficient bargaining power to enforce their rights privately. Empirical evidence on the effect of legal effectiveness on firm growth and financing is provided by Demirguc-Kunt and Maksimovic (1998, 1999), and on growth at more aggregated levels by Levine (1998, 1999, 2000). This paper extends the methodology of Demirguc-Kunt and Maksimovic (1998) to address the questions of the differences in bank-based and market-based systems in firm growth.

The rest of the paper is organized as follows. Section 2. briefly discusses reasons to believe that bank-based and market-based systems perform differently, and our approach to testing those differences empirically. Section 3. introduces the data and summary statistics. Our principal results are reported in Section 4.. Section 5. concludes.

2. BANK-BASED AND MARKET-BASED FINANCIAL SYSTEMS

2.1 How do the systems differ?

Among a financial system's major tasks is to mobilize resources for investment, select investment projects to be funded, and to provide incentives for the monitoring of

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and bank-based financial systems.

[2] See also Wurgler (2000) for an analysis of industry growth.

the performance of the funded investments. A large body of theoretical and empirical research has analyzed how these tasks are performed in a market-based system, and how they are performed in a system where banks and other financial intermediaries play a major role. This research has identified significant differences in incentives. These differences raise the possibility that a bank-based or a market-based system is inherently superior, and that economic performance can be enhanced by adopting the superior system.

A second approach, identified with LLSV (1999), stresses the importance of the legal system in determining the enforceable contracts between firms and investors. According to this view, the relevant differences between countries is in the extent to which their financial systems protect investor rights. The distinction between bank-based and market-based systems is seen as secondary.

In our examination of the differences between bank-based and market-based financial systems we adopt a maintained hypothesis that has elements of both of these approaches. We posit that there exist significant differences in outcomes between systems in which financial intermediaries like banks play the dominant role and those where they do not. For example, as explored by Allen and Gale (1999), banks and stock markets may have a comparative advantage in selecting different types of investment projects. Banks may also have a comparative advantage in providing short-term financing.

In common with the legal approach, we posit that the absolute quality of the banks and securities markets in a country depends on the legal system's ability to enforce contracts. However, we argue that the legal systems in different countries may have a comparative advantage in supporting a quality banking system or a quality securities

markets. Thus, for example, a country with an inefficient legal system may have a low-quality financial system. However, it may, through a combination of administrative regulation of the banking system, and strong banks with bargaining power vis-à-vis their customers, partially compensate for the effect of the deficiency of the legal system on banks. It may be more difficult to compensate for the effect of poor legal protections on a securities markets. Thus, while the level of development of the legal system in each country may be the major determinant of the quantity of financial services supplied, the comparative advantage in supporting intermediaries and markets may determine the optimal mix of banks versus markets.

These considerations suggest the following hypotheses:

H1. For each country there is a "warranted" level of development of the banking sector and of stock markets, as a function of the level of development of the contracting environment. The provision of external financing to firms is greater, the higher the warranted level of development of these sectors.

H2. The expansion of one of the sectors, banks or securities markets beyond the levels warranted by the contracting environment is unlikely to produce an improved allocation of resources.

H3. Because the banking system and securities markets have a comparative advantage in providing different services, cross-country differences in the warranted development levels of markets and the banking sectors may affect the type of finance constraints faced by firms.

2.2 Testing for differences in performance between the systems

Differences between outcomes in market-based and bank-based systems should, if they exist, be observable at the country, industry or firm levels. In principle, a test would relate a performance measure, usually the growth rate, to the financial system or legal system characteristics. While this results in straightforward applications at the country level, there exists a potential selection bias when this procedure is applied at lower levels of aggregation, such as the industry and firm levels.

The selection bias may arise because the way in which production is organized in different countries may depend on their legal and financial systems. Thus, the firms that are observed in a country are those that are adapted to the financial system of that country. Analyzing growth rates of those firms does not take into account the possibility that a different financial system might induce a different mix of firms, and that the different mix might increase wealth.

To fix ideas, consider an example involving two countries, B and M. Country B has a bank-based financial system (perhaps because its legal system favors that type of contracting). Country M has a market-based system. Assume that the two financial systems have different comparative advantages in supplying financing. In particular, assume that market-based systems are superior at providing long-term financing. Consider entrepreneurs in each country starting firms in the same industry. Entrepreneurs in country M have a greater choice of technology and organizational forms since they have greater access to long-term financing. As a result, economy M is better off. However, once the initial investment is made, each individual firm, and the industry as a whole, may grow at the same rate in country B and in country M. Indeed, firms in

country B may grow faster, because they can switch to a superior technology as they accumulate enough funds over time to self-finance its acquisition. In this case, a comparison of firm or industry growth rates across countries may not identify the benefits of a market-based financial system.

An alternative approach, developed in Demirguc-Kunt and Maksimovic (1998), is to test for differences between financial systems by testing whether the proportion of firms growing at rates that exceed the rate that they can self-finance, or finance using short-term instruments only, differs across different financial or legal systems.[3] This is the approach we employ below, using firm-specific data to determine whether each firm in the sample is constrained.

While the use of firm-specific data brings advantages, it also entails two potential costs. First, the firms for which data is available are likely to be a relatively small number of the largest publicly traded firms in each economy. While such firms are of independent interest, they may not be fully representative of firms in the economy.[4] Second, as discussed by Ball (1995), the quality of firm-level financial data may differ across countries. Thus, the findings of firm-level and industry-level studies need to be assessed jointly.

3. DATA AND SUMMARY STATISTICS

3.1 Description of Sample

The firm-level data consist of financial statements for the largest publicly traded manufacturing firms in 40 countries (SIC codes 2000-3999). Our sample of firms contains 45,598 annual observations over the period 1989-1996. The sample is from

[3] This approach would identify the financial system in economy M above as being superior.

Worldscope and contains data from both developed and developing countries as listed in Table AI in the Appendix. For each of the countries we also use data on financial system development compiled by Beck, Demirguc-Kunt and Levine (1999).

In Table 1 we present pertinent facts about the level of economic and institutional development in the sample countries. The countries are arranged from highest to lowest average per capita Gross Domestic Product (RGDPPC) in 1990 dollars. They range from Switzerland, with a per capita income of $26,972 to Pakistan, with a per capita income of $319.

Table 1
Legal and Financial Indicators

GDP/CAP is the real GDP per capita in 1990 US$. Law and order indicator, produced by International Country Risk rating agency, reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes. It is scored 0-6 with higher scores indicating sound political institutions and a strong court system. Lower scores indicate a tradition of depending on physical force or illegal means to settle claims. Common Law Dummy takes the value one for common law countries and the value zero for others. Creditor rights is an index that ranges from 0 to 4 and aggregates creditor rights and Shareholder rights is an index that ranges from 0 to 5 and aggregates shareholder rights as described in the text. These three variables are obtained from La Porta, Lopez-de-Silanes, Shleifer and Vishny (1996). Turnover is the total value of shares traded in the stock exchange divided by market capitalization. Stock market data are from IFC's Emerging Market Data Base. Bank/GDP is the total assets of the deposit money banks divided by GDP. It is obtained from IMF, International Financial Statistics. Market1 is a variable that takes on the value 1 for market-based financial systems and 0 for bank-based systems as defined in Demirguc-Kunt and Levine (1999). All values are 1989-96 averages.

	GDP/CAP (US $)	Law and Order Indicator	Common Law Dummy	Creditor Rights Index	Shareholder Rights Index	Turnover	Bank/GDP	Market1
Switzerland	26972	6.00	0	1	2	0.74	1.74	0
Japan	23467	5.44	0	2	4	0.43	1.31	0
Norway	22162	6.00	0	2	4	0.52	0.71	0
Denmark	21447	6.00	0	3	2	0.42	0.51	0
United States	19998	6.00	1	1	5	0.71	0.75	1
Sweden	19582	6.00	0	2	3	0.42	0.55	1
Finland	18521	6.00	0	1	3	0.32	0.79	0
Germany	17804	5.75	0	3	1	1.25	1.19	0
France	17588	5.50	0	0	3	0.47	1.01	0
Austria	17433	6.00	0	3	2	0.61	1.25	0
Netherlands	16744	6.00	0	2	2	0.55	1.10	1
Canada	16243	6.00	1	1	5	0.44	0.62	1
Belgium	16104	6.00	0	2	0	0.15	1.07	0
Italy	14783	5.00	0	2	1	0.39	0.72	0
Australia	13873	6.00	1	1	4	0.41	0.73	1
United Kingdom	13067	5.31	1	4	5	0.50	1.13	1

[4] Industry-level data may suffer from the opposite bias: many of the firms included in industry statistics are very small and would not qualify for significant external financing under any financial system. See Rajan and Zingales (1999) discussion of European data.

Ireland	12034	5.00	1	1	4	0.62	0.36	0
Singapore	11707	5.19	1	4	4	0.47	0.93	1
New Zealand	11332	6.00	1	3	4	0.25	0.76	0
Israel	9787	3.31	1	4	3	0.65	0.95	0
Hong Kong	9565	4.69	1	4	5	0.50	1.49	1
Spain	9506	5.00	0	2	4	0.57	0.95	0
Greece	5257	4.25	0	1	2	0.30	0.42	0
Korea	4785	3.69	0	3	2	1.21	0.53	1
Portugal	4620	5.19	0	1	3	0.33	0.76	0
Argentina	3623	3.56	0	1	4	0.36	0.21	0
Malaysia	2708	3.69	1	4	4	0.44	0.79	1
South Africa	2287	2.69	1	3	5	0.08	0.63	0
Chile	2243	4.19	0	2	5	0.10	0.46	1
Brazil	2034	3.75	0	1	3	0.55	0.32	1
Mexico	1824	3.00	0	0	1	0.41	0.22	1
Turkey	1626	3.19	0	2	2	0.86	0.19	1
Thailand	1517	4.31	1	3	2	0.77	0.77	1
Colombia	1321	1.19	0	0	3	0.09	0.17	0
Peru	775	1.69	0	0	3	0.30	0.11	1
Philippines	619	2.13	0	0	3	0.26	0.34	1
Indonesia	610	3.00	0	4	2	0.40	0.45	0
India	405	2.50	1	4	5	0.40	0.34	0
Pakistan	319	1.88	1	4	5	0.29	0.36	0

As an indicator of the ability of firms to enter into financial contracts we use a commercial index of experts' evaluations of the efficiency of the state in enforcing property rights within each country. This measure, produced by the International Country Risk rating agency, reflects the degree to which the citizens of a country are willing to accept the established institutions to make and implement laws and adjudicate disputes. It is scored on a zero to six scale, with higher scores indicating sound political institutions and a strong court system. Lower scores indicate a tradition of depending on physical force or illegal means to settle claims. This indicator has been used in previous studies comparing institutions in different countries (e.g., Knack and Keefer (1995), Demirguc-Kunt and Maksimovic (1998)).

We place more weight on this indicator than on a comparison of specific differences in the legal codes across countries. Such a comparison may be misleading, because firms may be able to compensate for the absence of specific legal protections by altering the

provisions of contracts. It is likely to be more difficult to compensate for the systemic failures of the legal system to adjudicate claims captured by the law and order indicator. In Demirguc-Kunt and Maksimovic (1999), we show that the index is a good predictor of the use of long-term debt by large firms in our sample of countries. By contrast, we find less evidence that the indicators of specific legal protections identified by LLSV predict the use of long-term debt. However, for completeness we also present indicators obtained by LLSV. Common Law Dummy takes the value one for common law countries and the value zero for others. As argued by LLSV, common law legal systems are more likely to offer protections to outside investors than civil law systems. Creditor rights is an index that ranges from 0 to 4 and aggregates creditor rights, and shareholder rights is an index that ranges from 0 to 5 and aggregates shareholder rights as described in the text. The creditor and shareholder rights variables are described in LLSV.

Table 1 shows that our sample contains countries with legal systems of very diverse levels of effectiveness. It contains highly effective common law legal systems (such as the United States and Canada) and less effective legal systems (such as India and Pakistan), as well as highly effective civil systems (such as Switzerland) and less effective systems such as those in Columbia and Peru.

For each country we also present three indicators of financial system development. As an indicator of whether the financial system is bank-based or market-based we use a dummy variable, MARKET1, defined in Demirguc-Kunt and Levine (1999). The variable classifies countries as being market-based when they have larger, more active and efficient stock markets compared to banks.[5]

[5] Market 1 is a dummy that takes the value 1 for higher than mean values of an aggregate Structure index. Structure index is the means-removed average of relative size, relative activity and relative efficiency

We also present two other measures of the development of the market and the banking sector separately. Turnover, TOR, is the total value of shares traded in the stock exchange divided by market capitalization. Stock market data are from IFC's Emerging Market Data Base.[6] Bank/GDP is the total assets of the deposit money banks divided by GDP. It is obtained from IMF, International Financial Statistics. Both variables have been used in our previous firm-level studies (Demirguc-Kunt and Maksimovic (1998, 1999). Countries scoring high on TOR include East Asian economies which were experiencing a market boom at this time, and the United States and the United Kingdom. Countries with low scrores include Latin American countries such as Chile and Columbia, and Peru, as well as European countries such as Greece and Portugal. Countries with a large banking sector include Switzerland, Japan, Germany and Hong Kong, whereas Mexico, Turkey and Columbia have small banking sectors relative to their GDP.

3.2 Measures of firm growth

To measure whether firms' growth in an economy is financially constrained we adopt the approach of Demirguc-Kunt and Maksimovic (1998). For each firm in an economy we estimate a rate at which it can grow, relying only on its internal funds or on short-term borrowing. We then compute the proportion of firms that grow at rates that exceed each of these two estimated rates each year. We then examine whether the proportions of firms growing faster than each of the two estimated rates differ between bank-based and

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measures. Relative size is given by the ratio of stock market capitalization to total assets of deposit money banks; relative activity is defined as the total value of stocks traded divided by bank credit to the private sector; and finally relative efficiency is given by the product of total value traded on the stock market and average overhead costs of banks in the country. See Demirguc-Kunt and Levine (1999) for a discussion of alternative ways of defining market-based and bank-based systems.

[6] An alternative measure, used in Levine (2000), is the ratio of total value traded to GDP. Since our sample consists of firms that are already listed on the stock exchange, the ratio of value traded to market capitalization provides a measure of the activity levels of the financial markets that is more relevant to these firms.

market-based financial systems, and whether they are affected by the level of development of the legal system.

Our estimate of the firm's growth rate is based on the standard "percentage of sales" financial planning model (Higgins (1974)). This model relates a firm's growth rate to its need for external funds. The external financing need at time t of a firm growing at g_t percent a year is given by

$$EFN_t = g_t * Assets_t - (1 + g_t) * Earnings_t * b_t \qquad (1)$$

where EFN_t is the external financing need and b_t is the proportion of the firm's earnings that are retained for reinvestment at time t. Earnings are calculated after interest and taxes. The first term on the right-hand side is the required investment for a firm growing at g_t percent. The second term is the internally available capital for investment, taking the firm's retention ratio as given.

The financial planning model makes several implicit assumptions about the relation between the firm's growth rate and the EFN_t. First, the ratio of assets used in production to sales is assumed to be constant. Thus, the required total investment increases in proportion to the firm's growth in sales. Second, the firm's profit rate per unit of sales is constant.[7] Third, we assume that the economic depreciation of existing assets equals that reported in the financial statements.

We use two estimates of each firm's attainable growth rate. The internally financed growth rate IG_t is the maximum growth rate that can be financed if a firm relies only on its internal resources and maintains its dividend. It is obtained by assuming that

[7] This assumption was examined in Demirguc-Kunt and Maksimovic (1998). The results in that paper were not sensitive to different assumptions about the rate of return on marginal sales.

the firm retains all its earnings (i.e., $b_t = 1$), equating EFN_t to zero and solving (1) for g_t, and is given by

$$IG_t = ROA_t/(1 - ROA_t),$$

where ROA_t is the firm's return on assets, or the ratio of earnings after taxes and interest to total assets. IG_t is increasing in the firm's return on assets. Thus, more profitable firms can finance higher growth rates internally.

The short-term financed growth rate SGR_t is an estimate of the maximum growth rate that can be attained if the firm uses only short-term external financing. It is obtained by using only the value of assets that are not financed by new short-term credit in place of total assets in equation (1). The assets not financed by short-term debt are termed "long-term capital'' $ROLTC_t$ and are obtained by multiplying total assets by one minus the ratio of short-term liabilities to total assets. More specifically, SFG_t is given by

$$SFG_t = ROLTC_t/(1 - ROLTC_t).$$

The use of the current realized ratio of short-term borrowing to assets to calculate SFG_t ensures that the estimate is feasible, and does not assume levels of short-term credit that are so costly that firms would not choose them.

The estimates of IG_t and SFG_t are conservative in several ways. First, each estimated maximum growth rate assumes that a firm utilizes the unconstrained sources of finance no more intensively than it is currently doing.[8] Second, firms with spare capacity do not need to invest and may grow at a faster rate than predicted by the financial planning model. We attempt to mitigate the potential problem posed by spare capacity by using each firm's maximum constrained growth rates averaged over the second half of

[8] In the case of *IG* the unconstrained source of finance is trade credit. In the calculation of *SFG* the unconstrained sources are trade credit and short-term borrowing.

the sample period in our tests below. Third, the financial planning model abstracts from technical advances that reduce the requirements for investment capital. Thus, it may overstate the cost of growth and underestimate the maximum growth rate attainable using unconstrained sources of finance.

For each country in the sample we compute the proportion of firms whose mean annual real growth rate of sales exceeds the means of the two maximum constrained growth rates defined above. Thus, taking *IG* as an example, for each firm *f* in each country *c* and for each year *t* we estimate IG_{fct}. We form a dummy variable for each firm *f* which takes on the value one if the firm inflation-adjusted realized growth rate exceeds the predicted rate, and zero otherwise: $d_{fct}=1$ if $g_{fct} > IG_{fct}$ and is 0 otherwise. Finally, for each country and each year we obtain $STCOUNT_{ct}$, the proportion of firms that grow at average rates exceeding the IG_{fct} rate in year *t*, $\Sigma_f d_{fct}/n_{ct}$, where n_{ct} is the number of firms in each country in year *t*. We repeat the same calculations with *SFG* in place of *IG* to obtain $LTCOUNT_{ct}$ the proportion of firms that grow at average rates exceeding the SFG_{fct} rate in year *t*. Thus, $LTCOUNT_{ct}$ is an estimate of the proportion of firms that obtain long-term financing (debt and/or equity), by issuing public or privately placed securities or by borrowing from the financial sector.

Our final variable is $DCOUNT_{ct}$, the proportion of firms in a country that grow at a rate that exceeds IG_t but does not exceed SFG_t. Thus, this variable measures the proportion of firms that have access to short-term financing, but not necessarily access to long-term financing. Thus, DCOUNT proxies for the relative availability of short-term financing compared to the availability of long-term financing.

Table 2
Firm Characteristics

LTCOUNT is the proportion of firms in a country whose mean growth of real sales exceeds their mean maximum short-term financed growth rate (SFG). STCOUNT is the proportion of firms whose mean growth of real sales exceeds their mean internally financed growth rate (IG). DCOUNT is given by (STCOUNT-LTCOUNT)/STCOUNT. NFATA is the net fixed assets divided by total assets. NSNFA is the net sales divided by net fixed assets. SIZE is the total assets of the firm divided by the GDP of the country. The data set, obtained from WorldScope, consists of 45,598 annual firm level observations over the period 1989-1996. These are the largest publicly traded manufacturing firms in 40 countries. All values are 1989-96 averages.

	LTCOUNT	STCOUNT	Y	NFATA	NSNFA	SIZE
Argentina	0.41	0.45	0.11	0.49	2.36	2.60
Australia	0.44	0.49	0.13	0.36	3.88	2.90
Austria	1.00	1.00	0.00	0.30	4.87	2.57
Belgium	0.52	0.58	0.11	0.27	5.39	3.65
Brazil	0.42	0.43	0.01	0.56	1.63	3.34
Canada	0.53	0.57	0.07	0.39	4.51	1.66
Chile	0.30	0.38	0.34	0.52	1.60	8.62
Colombia	0.24	0.26	0.14	0.29	3.04	9.20
Denmark	0.42	0.50	0.17	0.36	4.07	1.96
Finland	0.51	0.57	0.11	0.36	4.01	13.60
France	0.41	0.50	0.20	0.22	6.79	1.75
Germany	0.91	0.93	0.02	0.29	6.35	0.67
Greece	0.35	0.45	0.25	0.33	4.11	1.13
Hong Kong	0.47	0.49	0.06	0.38	2.84	5.77
Indonesia	0.50	0.59	0.15	0.39	3.33	1.30
Indonesia	0.43	0.59	0.29	0.41	3.41	0.80
Ireland	0.40	0.52	0.21	0.38	3.47	11.90
Israel	0.68	0.75	0.12	0.30	4.64	6.46
Italy	0.42	0.48	0.12	0.26	4.87	0.99
Japan	0.48	0.55	0.14	0.29	4.02	0.35
Korea	0.69	0.75	0.08	0.39	2.66	4.92
Malaysia	0.51	0.58	0.14	0.46	2.26	3.60
Mexico	0.49	0.53	0.09	0.61	1.37	3.81
Netherlands	0.37	0.47	0.23	0.38	4.56	3.76
New Zealand	0.40	0.42	0.04	0.39	3.44	11.60
Norway	0.46	0.51	0.12	0.31	5.53	5.74
Pakistan	0.28	0.39	0.28	0.37	8.66	0.75
Peru	0.46	0.50	0.10	0.53	1.83	2.30
Philippines	0.28	0.34	0.17	0.44	2.84	2.50
Portugal	0.47	0.51	0.09	0.44	2.76	2.56
Singapore	0.46	0.55	0.19	0.34	3.37	7.62
South Africa	0.11	0.20	0.51	0.35	6.13	5.39
Spain	0.37	0.42	0.17	0.39	3.69	1.41
Sweden	0.44	0.52	0.18	0.33	4.16	7.68
Switzerland	0.48	0.53	0.12	0.37	3.81	8.36
Taiwan	0.37	0.47	0.21	0.40	2.29	5.85
Thailand	0.32	0.48	0.35	0.43	3.10	1.34
Turkey	1.00	1.00	0.00	0.33	6.03	2.39
United Kingdom	0.35	0.44	0.26	0.36	4.85	0.62
United States	0.46	0.51	0.11	0.29	6.20	0.17

Table 2 shows the country averages for $LTCOUNT_{ct}$, $STCOUNT_{ct}$ and $DCOUNT_{ct}$. The table also presents three descriptors of the firms in each country: The net fixed assets divided by total assets *NFATA*, the net sales divided by net fixed assets *NSNFA*, and *SIZE*, the total assets of the firm divided by the GDP of the country.

The table shows interesting variation in the proportion of firms obtaining external financing. Thus, for example, approximately half the US firms in our sample grow at rates exceeding IG_t, but only 20% of the South African firms do so.

The variation in the proportion of firms obtaining external financing may be driven by differences in legal and financial systems. However, they may also be caused by differences in firm characteristics. For example, firms with a higher average ratio of net fixed assets to total assets may require more long term financing than firms with a lower ratio. This may be one of the reasons why we observe a relatively high LTCOUNT for a country like Peru. Also firms that are larger relative to their economy may enjoy better access to the available external financing than smaller firms in the same country. To the extent that the firms in our sample from the less developed economies are larger relative to their economy than firms in more developed economies, Table 2 overstates access to external financing in less developed economies. Finally, inflation adjustment in calculating real sales growth may lead to additional problems in high inflation countries, as in the case of Turkey. In our regressions, we try to control for firm characteristics and macro variables. We also test the sensitivity results to outliers.

3.3 Summary Statistics

We treat each date/country combination as a separate observation and analyze the resulting panel. Table 3 presents the summary statistics for our sample. Panel A presents the univariate statistics.

Table 3
Summary Statistics

LTCOUNT is the proportion of firms in a country whose mean growth of real sales exceeds their mean maximum short-term financed growth rate (SFG). STCOUNT is the proportion of firms whose mean growth of real sales exceeds their mean internally financed growth rate (IG). DCOUNT is given by (STCOUNT-LTCOUNT)/STCOUNT. LAW & ORDER, scored 1 to 6, is an indicator of the degree to which the citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. GROWTH is the growth rate of the real GDP per capita. INFLATION is the inflation rate of the GDP deflator. SIZE is given by total assets divided by country GDP. NFATA is the net fixed assets divided by total assets. NSNFA is net sales divided by net fixed assets. MARKET is a dummy variable that takes the value 1 for values of TOR/(BANK/GDP) that are higher than the sample median and 0 otherwise. COMMON is a dummy that takes the value 1 for common law countries and the value zero for others. BANK/GDP is the total assets of the deposit money banks divided by GDP. TOR is stock market turnover defined as the total value of shares traded divided by market capitalization. GDP/CAP is the real GDP per capita in thousands of US$. All country level variables are annual figures, averaged over the 1989-1996 period. All firm-level variables are averaged over firms in each country and over the 1989-1996 period. Panel A presents the summary statistics for the countries listed in Table I. Panel B reports correlation coefficients.

Panel A: Summary Statistics

	N	Mean	Std Dev	Minimum	Maximum
LTCOUNT	389	0.467	0.279	0	1
STCOUNT	389	0.531	0.260	0	1
DCOUNT	383	0.152	0.176	0	1
LAW & ORDER	336	4.546	1.579	1	6
GROWTH	388	0.026	0.036	-0.135	0.114
INFLATION	417	0.170	0.511	-0.001	4.328
SIZE	407	0.007	0.023	0.000	0.199
NFATA	411	0.376	0.093	0.151	1
NSNFA	394	3.929	1.963	1.000	19.627
MARKET	387	0.501	0.501	0	1
COMMON	420	0.333	0.472	0	1
BANK/GDP	405	0.722	0.397	0.058	1.818
TOR	402	0.552	0.607	0.004	5.277
GDP/CAP	396	10.165	8.187	0.242	27.828

Panel B: Correlation Matrix

	LTCOUNT	STCOUNT	DCOUNT	LAW	GROWTH	INFL.	SIZE	NFATA	NSNFA	MARKET	COMMON	BANK/ GDP	TOR
STCOUNT	.964***												
DCOUNT	-.570***	-0.380***											
LAW	.178***	0.161***	-.243***										
GROWTH	.145***	.194***	.006	.058									
INFLATION	.051	.008	-.140**	-.313***	-.155***								
SIZE	.101**	.073	-.123**	.150***	.059	-.041							
NFATA	-.126**	-.151***	-.028	-.335***	-.002	.423***	-.005						
NSNFA	.053	.089*	.145***	.083	-.130***	-.222***	-.165***	-.672***					
MARKET	.069	.092*	-.018	-.223***	.147***	.140***	-.156***	.177***	-.114**				
COMMON	-.145***	-.106*	.171***	-.035	.003	-.154***	-.087*	-.009	-.162***	-.085*			
BANK/GDP	.078	.075	-.045	.552***	-.024	-.321***	-.090*	-.354***	.143***	-.258***	-.019		
TOR	.077	.113**	.005	.109*	.119**	-.048	-.131***	-.013	-.029	.460***	-.108**	.307***	
GDP/CAP	.157***	.143***	-.161***	.774***	-.093*	-.279***	.192***	-.501***	.299***	-.188***	-.099**	.609***	.052

*, ** and *** indicate significance levels of 10, 5 and 1 percent respectively.

The correlation matrix is presented in Panel B. Inspection of Panel B shows that the measures of the availability of external financing LTCOUNT and STCOUNT are highly positively correlated with the level of development of the legal system. Consistent with Demirguc-Kunt and Maksimovic (1998), a larger proportion of firms in countries with good legal systems grow at rates requiring external financing. More firms also use external financing in economies that are growing fast, and in economies with higher per capita incomes.

The firm characteristics associated with external financing are firm size and a low ratio of net fixed assets to total assets. However, the interpretation of the pairwise correlation is unclear. The ratio of net fixed assets to total assets is highly negatively correlated with the efficiency of the legal system, the GDP per capita and with the size of the banking system, and highly positively correlated with the inflation rate.

The pairwise correlations between *LTCOUNT* and *STCOUNT* and our descriptors of financial structure are weak. *STCOUNT* is positively related to *TOR* and to *MARKET*, a dummy variable which takes a value of 1 when the ratio of *TOR* to BAN*K/GDP* exceeds the sample median, and zero otherwise. However, *LTCOUNT* is not significantly correlated with either. *BANK/GDP* is not significantly correlated with *STCOUNT* or *LTCOUNT*.

DCOUNT is strongly negatively correlated with LAW and GDP per capita. Thus, in countries with efficient legal systems and high incomes, a smaller proportion of firms has access to short-term financing but grows at rates below those requiring long-term

financing. By contrast, in countries in which firms have a high ratio of sales to assets, firms are more likely to rely on short-term rather than long-term financing.[9]

An interesting finding is that the firms in our sample in common law countries are less likely to grow at rates requiring external financing than firms in civil law countries. A positive correlation between DCOUNT and the common law dummy also suggests that in common law countries a larger proportion of firms that require external financing grow at rates that do not require access to long-term financing.

The pairwise correlation results must be interpreted with caution. Inspection of Panel B shows that in our sample the average firm in countries where the legal system is efficient and in civil law countries is larger relative to its country's GDP then the average firm in countries where the legal system is less efficient and in common law countries. Firm descriptors NFATA and NSNFA are also correlated with the efficiency of the legal system and legal origin. We control for those firm effects in our multivariate analysis.

4. EXCESS GROWTH OF FIRMS AND FINANCIAL STRUCTURE

We analyze the effect of a country's financial system on firm growth in three stages. First, we regress our financial system indicators, TOR and BANK/GDP on descriptors of the contracting environment. These regressions yield the estimates of the securities markets activity level and the size of the banking sector predicted by the level of development and characteristics of the legal system. We next regress our excess growth variables STCOUNT, LTCOUNT and DCOUNT on these predicted values, and on control variables. These regressions allow us to test whether the legal system

[9] Inflation is also negatively correlated with *DCOUNT*. However, in view of the potential effect of inflation on firm growth rates we treat inflation as a control variable in the regressions and do not interpret it directly.

influences excess growth by affecting the development of the financial system. Finally, we augment these regressions by indicators of the relative development of the stock markets to the banking system. These regressions allow us to test whether market-based or bank-based systems perform differently.

We instrument for TOR and BANK/GDP variables used in the second stage using variables that proxy for the contracting environment in each country. This choice is motivated by the hypotheses that the development of the legal system can be taken as exogenous and that financial system development depends primarily on the ability of investors or financial intermediaries on one hand, and firms, on the other hand, to enter into effective contracts.

We use the LAW&ORDER indicator of legal effectiveness as a proxy for the contracting environment. As suggested by LLSV we also use a legal origin variable, the common law dummy, and the specific indices of shareholder and creditor rights. Finally, as a proxy for the ability to enter into financial contracts, we use the rate of inflation.

In the second stage we regress the dependent variables on the predicted values of TOR and BANK/GDP and several control variables. In the case of STCOUNT, for example, the estimated equation is

$$\text{STCOUNT} = \gamma_1 + {}_2\text{TOR} + \gamma_3\ \text{BANK/GDP} + \gamma_4\ \text{GROWTH} + \gamma_5\ \text{INFLATION} + \gamma_6\ \text{SIZE} + \gamma_7\ \text{GDP/CAP} + \gamma_8\ \text{LAW \& ORDER} + \varepsilon$$

We interpret these predicted financial sector variables as the stock-market activity levels and the size of the banking sector that is predicted by a country's contracting environment, respectively. We also include LAW & ORDER separately, to test for the additional channels, independent of the financial system, by which the contracting environment may affect the firms' access to financing.

We also include several control variables.[10] We include *GROWTH* to control for the possibility that the firms' desire to grow at rates that require external financing depends on the rate of growth of the economy.[11] We also include *INFLATION* to control for the possibility that in economies with high inflation the growth rates of firms will be overstated.

We also include two additional control variables. *SIZE* measures the average size of the firms in each country as a proportion of their GDP. We hypothesize that large firms have more access to the country's financial markets and institutions. Thus, this variable controls for the differences in sample selection across countries.

There may exist differences in access to financing that are related to the level of development but not specifically related to the development of the legal system. We include GDP per capita in the equation to serve as a proxy for these differences.

Our regression is estimated as a year-country unbalanced panel using a random effects estimator. This methodology allows us to include dummy variables, which are constant across countries in our specifications. The use of random effects panel estimators is also indicated when the explanatory variables are subject to measurement error (Moulton (1987)).

[10] Additional firm-specific variables NFATA and NSNFA were included in unreported runs. They were not significant and did not affect the reported results.

[11] If the economy is growing fast, the rate of profit is likely to be high. This will also tend to increase the rates *IG* and *SGR*, permitting faster growth without access to external financing. The variable *GROWTH* allows for the possibility of additional effects of the growth in the economy.

Table 4
Excess Growth of Firms and Financial Structure

Panel A: Constraints on Short-Term and Long-Term Debt -- The regression equation estimated is: STCOUNT = $\forall$ + $\exists_1$TOR + $\exists_2$ BANK/GDP +$\exists_3$ GROWTH +$\exists_4$ INFLATION + $\exists_5$ SIZE + $\exists_6$ GDP/CAP + $\exists_7$ LAW & ORDER + $\exists_8$ MARKET + $\exists_9 E_{TOR}$ + $\exists_{10} E_{BANK/GDP}$ + ,. The sample consists of 45,598 manufacturing firms in 40countries over the period 1989-1996. Firm level variables are averaged for each country, each year. Dependent variable is the proportion of firms whose mean growth of real sales exceeds their mean internally financed growth rate (IG). TOR is stock market turnover defined as the total value of shares divided by market capitalization. BANK/GDP is the total assets of the deposit money banks divided by GDP. GROWTH is the growth rate of the real GDP per capital. INFLATION is the inflation rate of the GDP deflator. SIZE is total assets of firms divided by GDP of the country, in thousands. GDP/CAP is real GDP per capita in thousands of US$. NFATA is net fixed assets divided by total assets. LAW & ORDER, scored 1 to 6, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. MARKET is a dummy variable that takes the value 1 for values of TOR/(BANK/GDP) that are higher than the sample median and 0 otherwise. TOR and BANK/GDP used in estimation are the predicted values obtained from the following regressions: TOR = $\forall$ + $\exists_1$ LAW & ORDER + $\exists_2$ COMMON-LAW DUMMY + $\exists_3$ INFLATION + $\exists_4$ SHARE HOLDER RIGHTS + , and BANK/GDP = $\forall$ + $\exists_1$ LAW & ORDER + $\exists_2$ COMMON-LAW DUMMY + $\exists_3$ INFLATION + $\exists_4$ CREDITOR RIGHTS + ,. SHAREHOLDER RIGHTS is an index that ranges from 0 to 5 and aggregates shareholder rights and CREDITOR RIGHTS is an index that ranges from 0 to 4.5 and aggregates creditor rights as described in the text. COMMON- LAW DUMMY takes the value 1 for common law countries and the value zero for others. E_{TOR} and $E_{BANK/GDP}$ are residuals from the above regressions. Regressions are estimated using panel data with random effects. Standard errors are given in parentheses.

	(1)	(2)	(3)
CONS.	-.082	-.068	-.060
	(.185)	(.174)	(.162)
TOR	.735**	.692***	.720***
	(.220)	(.291)	(.266)
BANK/GDP	.357*	.376**	.327*
	(.220)	(.206)	(.192)
GROWTH	1.702***	1.589***	1.425***
	(.468)	(.479)	(.482)
INFLATION	.061**	.094***	.087
	(.032)	(.032)	(.033)
SIZE	2.475	.216	-.838
	(6.125)	(5.947)	(5.584)
GDP/CAP	.001	.002	.005
	(.004)	(.004)	(.004)
LAW & ORDER	-.019	-.024	-.024
	(.023)	(.022)	(.021)
MARKET		.026	
		(.034)	
$E_{BANK/GDP}$			-.130*
			(.079)
E_{TOR}			.046
			(.055)
R^2 within	.06	.07	.06
R^2 between	.24	.25	.32
No. of Observations	283	267	267

*, ** and *** indicate significance levels of 10, 5 and 1 percent respectively.

Panel B: Constraints on Long-Term Debt -- The regression equation estimated is: LTCOUNT = $\forall$ + $\exists_1$TOR + $\exists_2$ BANK/GDP +$\exists_3$ GROWTH +$\exists_4$ INFLATION + $\exists_5$ SIZE + $\exists_6$ GDP/CAP + $\exists_7$ LAW & ORDER + $\exists_8$ MARKET + $\exists_9$ E_{TOR} + $\exists_{10}E_{BANK/GDP}$ + ,. The sample consists of 45,598 manufacturing firms in 40 countries over the period 1989-1996. Firm level variables are averaged for each country, each year. Dependent variable is the proportion of firms in a country whose mean growth of real sales exceeds their mean maximum short-term financed growth rate (SFG). TOR is stock market turnover defined as the total value of shares divided by market capitalization. BANK/GDP is the total assets of the deposit money banks divided by GDP. GROWTH is the growth rate of the real GDP per capital. INFLATION is the inflation rate of the GDP deflator. SIZE is total assets of firms divided by GDP of the country, in thousands. GDP/CAP is real GDP per capita in thousands of US$. NFATA is net fixed assets divided by total assets. LAW & ORDER, scored 1 to 6, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. MARKET is a dummy variable that takes the value 1 for values of TOR/(BANK/GDP) that are higher than the sample median and 0 otherwise. TOR and BANK/GDP used in estimation are the predicted values obtained from the following regressions: TOR = $\forall$ + $\exists_1$ LAW & ORDER + $\exists_2$ COMMON-LAW DUMMY + $\exists_3$ INFLATION + $\exists_4$ SHARE HOLDER RIGHTS + , and BANK/GDP = $\forall$ + $\exists_1$ LAW & ORDER + $\exists_2$ COMMON-LAW DUMMY + $\exists_3$ INFLATION + $\exists_4$ CREDITOR RIGHTS + ,. SHAREHOLDER RIGHTS is an index that ranges from 0 to 5 and aggregates shareholder rights and CREDITOR RIGHTS is an index that ranges from 0 to 4.5 and aggregates creditor rights as described in the text. COMMON- LAW DUMMY takes the value 1 for common law countries and the value zero for others. E_{TOR} and $E_{BANK/GDP}$ are residuals from the above regressions. Regressions are estimated using panel data with random effects. Standard errors are given in parentheses.

	(1)	(2)	(3)
CONS.	-.176	-.133	-.144
	(.208)	(.200)	(.184)
TOR	.843***	.819***	.830***
	(.360)	(.338)	(.307)
BANK/GDP	.261	.230	.202
	(.249)	(.237)	(.220)
GROWTH	1.738***	1.704***	1.517***
	(.496)	(.510)	(.514)
INFLATION	.089***	.124***	.118***
	(.034)	(.036)	(.035)
SIZE	3.904	1.864	.866
	(6.789)	(6.728)	(6.305)
GDP/CAP	.001	.002	.006
	(.005)	(.005)	(.005)
LAW & ORDER	-.014	-.018	-.019
	(.024)	(.024)	(.023)
MARKET		.011	
		(.037)	
$E_{BANK/GDP}$			-.137*
			(.089)
E_{TOR}			.024
			(.060)
R^2 within	.07	.08	.08
R^2 between	.19	.18	.25
No. of Observations	283	267	267

*, ** and *** indicate significance levels of 10, 5 and 1 percent respectively.

Panel C: Proportion Long-Term Constrained – The equation estimated is: DCOUNT = ∀ + $\exists_1$TOR + $\exists_2$ BANK/GDP +$\exists_3$ GROWTH +$\exists_4$ INFLATION + $\exists_5$ SIZE + $\exists_6$ GDP/CAP + $\exists_7$ LAW & ORDER + $\exists_8$ MARKET + $\exists_9$ E_{TOR} + $\exists_{10}$E $_{BANK/GDP}$ + ,. The sample consists of 45,598 manufacturing firms in 40 countries over the period 1989-1996. Firm level variables are averaged for each country, each year. Dependent variable is given by (STCOUNT-LTCOUNT)/STCOUNT, the proportion of firms in a country that grow at a rate that exceeds (IG) but does not exceed (SFG). TOR is stock market turnover defined as the total value of shares divided by market capitalization. BANK/GDP is the total assets of the deposit money banks divided by GDP. GROWTH is the growth rate of the real GDP per capital. INFLATION is the inflation rate of the GDP deflator. SIZE is total assets divided by GDP of the country, in thousands. GDP/CAP is real GDP per capita in thousands of US$. NFATA is net fixed assets divided by total assets. LAW & ORDER, scored 1 to 6, is an indicator of the degree to which citizens of a country are able to utilize the existing legal system to mediate disputes and enforce contracts. MARKET is a dummy variable that takes the value 1 for values of TOR/(BANK/GDP) that are higher than the sample median and 0 otherwise. TOR and BANK/GDP used in estimation are the predicted values obtained from the following regressions: TOR = ∀ + $\exists_1$ LAW & ORDER + $\exists_2$ COMMON-LAW DUMMY + $\exists_3$ INFLATION + $\exists_4$ ŞHARE HOLDER RIGHTS + , and BANK/GDP = ∀ + $\exists_1$ LAW & ORDER + $\exists_2$ COMMON-LAW DUMMY + $\exists_3$ INFLATION + $\exists_4$ CREDITOR RIGHTS + ,. SHAREHOLDER RIGHTS is an index that ranges from 0 to 5 and aggregates shareholder rights and CREDITOR RIGHTS is an index that ranges from 0 to 4.5 and aggregates creditor rights as described in the text. COMMON- LAW DUMMY takes the value 1 for common law countries and the value zero for others. E_{TOR} and $E_{BANK/GDP}$ are residuals from the above regressions. Regressions are estimated using panel data with random effects. Standard errors are given in parentheses.

	(1)	(2)	(3)
CONS.	.465***	.343***	.346***
	(.131)	(.119)	(.118)
TOR	-.411**	-.400**	-.403**
	(.224)	(.197)	(.196)
BANK/GDP	.148	.231*	.234*
	(.156)	(.140)	(.140)
GROWTH	-.674**	-.557*	-.542*
	(.332)	(.313)	(.317)
INFLATION	-.084***	-.076***	-.075***
	(.024)	(.022)	(.022)
SIZE	-.981	-.853	-.875
	(4.314)	(3.985)	(3.974)
GDP/CAP	.002	-.000	-001
	(.003)	(.003)	(.003)
LAW & ORDER	-.038***	-.024*	-.023*
	(.016)	(.014)	(.014)
MARKET		-.001	
		(.023)	
$E_{BANK/GDP}$			.020
			(.056)
E_{TOR}			-.000
			(.037)
R^2 within	.08	.07	.06
R^2 between	.25	.24	.25
No. of Observations	279	264	264

*, ** and *** indicate significance levels of 10, 5 and 1 percent respectively.

Table 4 presents the second-stage regression results. In Panel A the dependent variable is STCOUNT. Thus, the panel investigates the proportion of the firms in each country growing at a rate that requires external financing. The basic specification is given in equation (1).

The proportion of firms growing at rates requiring outside financing is higher in countries with high predicted TOR and BANK/GDP. Thus, a larger proportion of firms obtain outside financing when the contracting environment is conducive to the development of a large banking sector and an active stock market. This is in line with the implications of previous studies. The two control variables *GROWTH* and *INFLATION* are also significantly positive.

We do not identify any effects of average firm size relative to GDP or of the general level of development measured by GDP per capita on financing. We also do not identify any additional effects of the efficiency of the legal system not already accounted for in the development of the financial system.

Specification (2) augments the equation with a variable which takes the value one for those observations where the ratio of TOR to BANK/GDP exceeds the sample median, and zero otherwise. The *MARKET* dummy identifies market-based economic environments. Inspection of specification (2) reveals that there is no evidence that the relative ratio of market activity to the size of the banking sector affects the proportion of firms that obtain external financing.

In the specification (3) we augment the basic estimating equation with the residuals from the first-stage regressions. E_{TOR} is the component of the market activity level not predicted by the legal environment. $E_{BANK/GDP}$ is the difference between the

ratio of actual BANK/GDP and the level BANK/GDP predicted by the country's contracting environment. Positive coefficients for these variables would suggest that there is a benefit to market activity and or a large banking sector respectively, independently of the legal system.

The coefficients of E_{TOR} and $E_{BANK/GDP}$ are not significant at the five percent level, suggesting that there is little identifiable benefit to having a larger financial sector than that predicted by the legal contracting environment. If anything, the marginal significance of $E_{BANK/GDP}$ hints that an overexpansion of the banking sector beyond the predicted level may be evidence that resources are being misallocated. However, this result is sensitive to outliers in our sample. If we drop countries such as Peru and Turkey from the estimation, $E_{BANK/GDP}$ is not even marginally significant and BANK/GDP becomes significant at five percent in all specifications.

Panel B presents analogous regressions for *LTCOUNT*. Thus in this panel we explain the proportion of firms growing at rates that require additional long-term external financing. The results in Panel B are analogous to those presented in Panel A, with one exception. The coefficient for BANK/GDP, while remaining positive throughout, is no longer statistically significant.[12] Thus, we find less evidence that the size of the banking sector is an important determinant of the availability of long-term financing for the firms in our sample. This is consistent with the lack of significance of the *MARKET* indicator in specification (2).

The dependent variable in Panel C is *DCOUNT*, the proportion of firms that obtain external financing but do not grow at rates that require additional long-term

[12] Dropping outliers does not make BANK/GDP significant in LTCOUNT regressions although $E_{BANK/GDP}$ loses significance as in STCOUNT regressions..

capital. This proportion is likely to be high when the financial system is able to supply short-term financing efficiently, but is not able to supply long-term financing.

Inspection of all three specifications in Panel C shows that *DCOUNT* is negatively related to TOR and positively related to *BANK/GDP*. Firms that require external financing in economies with strong securities markets are more likely to obtain long-term financing. By contrast, firms that require external financing in economies with a strong banking sector are less likely to grow at rates that require long-term financing. This is consistent with the notion that well-developed securities markets facilitate long-term financing, whereas a well-developed banking sector facilitates short-term financing. Interestingly, *LAW&ORDER* also has a strong negative effect on *DCOUNT* independent of its effect through *TOR.*[13] The financial structure variables *MARKET*, of E_{TOR} and $E_{BANK/GDP}$ are again not significant.

The coefficients of the control variables *GROWTH* and *INFLATION* are significant in the expected directions. In high-growth economies a larger proportion of firms requiring external financing grows at rates that require long-term financing. In economies with high inflation rates, a higher proportion of externally financed firms grows at rate that exceeds the predicted rates *IG* and *SFG*.

We also investigated possible nonlinearities in the way financial variables may affect firm growth rates by including squared TOR and BANK/GDP terms into all specifications in Table 4. The squared TOR and BANK/GDP terms enter the DCOUNT regressions significantly with positive and negative signs, respectively. TOR and BANK/GDP terms also remain significant with their initial signs. This indicates that the positive impact of bank development on short term financing and stock market

development on long term financing are especially important at lower levels of financial development. [14]

This finding raises the possibility that relative development of banks versus markets may be particularly important at lower levels of development. To test this, we added an interaction term of MARKET with GDP per capita to specification (2) in all panels of Table 4. However, this variable failed to develop a significant coefficient. Another possibility is that financial structure is only important if the underlying legal structure is inadequate. This may be true since markets in general require a better developed legal system to function efficiently. However an interaction term of MARKET with LAW & ORDER variable does not develop a significant sign in any of the regressions in Table 4.

In sum, Table 4 yields several results:

First, we have no evidence that the relative levels development of the securities markets and the size of the banking sector, *by itself*, affect firms' access to external financing. Thus, there is no evidence that the development of a market-based or bank-based financial system *per se* affects access to financing.

Second, the securities markets and the banking system affect firms' ability to obtain financing in different ways, especially at lower levels of financial development. While the development of both improves access to external financing, the development of securities markets is more related to long-term financing, whereas the development of the banking sector is more related to the availability of short-term financing. Thus, for these countries differences in contracting environments that affect the relative development of

[13] Dropping outliers makes TOR less significant but LAW &ORDER more significant.

the stock market and the banking system may have implications for which firms and which projects obtain financing.

Third, the effect of the securities markets and banking system development is closely tied to the level of development of the country's contracting environment. Differences in the activity level of the securities markets not predicted by the contracting environment are not significantly related to the ability of firms do obtain external financing. This is consistent with the emphasis in LLSV on the importance of the legal system on financing.

Fourth, the proportion of firms that grow at rates that cannot be self-financed is positively related to the development of both the securities markets and the banking system. This is consistent with the findings of Demirguc-Kunt and Maksimovic (1998).

5. CONCLUSION

The relative development of banks versus markets varies considerably across countries. The financial systems of some countries, such as the US, are market-based, whereas the financial systems of other economies, such as Japan, are bank-based. In this paper we investigate whether this difference in the organization of financial systems affects firms' ability to obtain external financing for growth.

Our initial finding that that the proportion of firms that grow at rates that cannot be self-financed is positively related to the development of both the securities markets and the banking system. This is consistent with the findings of Demirguc-Kunt and Maksimovic (1998), and with parallel findings of Levine and Zervos (1998), at the country level, and Rajan and Zingales (1998), at the industry level.

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[14] The squared terms do not develop significant coefficients in STCOUNT regressions. In LTCOUNT

Our results show that the effects of the stock market and banking system development on firms' growth is closely tied to the level of development of the country's contracting environment. Development of the financial system beyond that predicted by the contracting environment are not significantly related to the ability of firms to obtain external financing. This is consistent with the emphasis on the importance of the legal system in LLSV on financing.

We find no evidence that the relative levels of development of the securities markets compared to that of the banking sector, affect firms' access to external financing. Thus, there is no evidence that the development of a market-based or bank-based financial system *per se* affects access to financing.

Finally, the securities markets and the banking system affect firms' ability to obtain financing in different ways, especially at lower levels of financial development. While the development of both, if predicted by the contracting environment, improves access to external financing, the development of securities markets is more related to long-term financing, whereas the development of the banking sector is more related to the availability of short-term financing. Thus, for these countries differences in contracting environments that affect the relative development of the stock market and the banking system may have implications for which firms and which projects obtain financing.

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regressions only the squared TOR is marginally significant in some specifications with a negative sign.

Appendix

Table A1
Number of Firm Level Observations in Each Country

The data source for firm level variables is WorldScope.

	Number of Firm Observations
Argentina	93
Australia	452
Austria	382
Belgium	370
Brazil	514
Canada	1133
Chile	173
Colombia	68
Denmark	700
Finland	480
France	2506
Germany	2717
Greece	363
Hong Kong	385
India	1219
Indonesia	366
Ireland	105
Israel	91
Italy	866
Japan	9411
Korea	825
Malaysia	774
Mexico	251
Netherlands	727
New Zealand	109
Norway	330
Pakistan	339
Peru	72
Philippines	121
Portugal	230
Singapore	341
South Africa	442
Spain	468
Sweden	661
Switzerland	771
Taiwan	503
Thailand	620
Turkey	222
United Kingdom	4475
United States	10706

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